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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,068	10/20/2003	Kenneth Wayne Boyd	TUC920030005US1	6656
46917 7590 07/27/2007 KONRAD RAYNES & VICTOR, LLP. ATTN: IBM37 315 SOUTH BEVERLY DRIVE, SUITE 210 BEVERLY HILLS, CA 90212			EXAMINER ASSESSOR, BRIAN J	
			ART UNIT 2114	PAPER NUMBER
			MAIL DATE 07/27/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/690,068

Applicant(s)

BOYD ET AL.

Examiner

Brian J. Assessor

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,11,13,14,21,23,24 and 31-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,11,13,14,21,23,24 and 31-42 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

Claims 2, 6, 12, 16, 22, and 26.

Claims 1, 5, 7, 11, 15, 17, 21, 23-25, and 27-30 are amended and area address below.

Claims 1,3-5,7-11,13-15,17-21,23-25 and 27-30, are still pending in this application and are addressed below.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4, 11, 14, 21, 24, 31-33, 35-37, 39-40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bhaskaran (6,266,335) in view of Kandasamy (5,513,314).

As per claim 1:

A method comprising:

receiving an indication of a failure of a primary storage subsystem at a switch,

(Bhaskaran column 8, lines 46-49)

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subsequently, directing a command from the host received at the switch to the secondary storage subsystem for completion. (Bhaskaran column 8, lines 49-50)

by changing a source volume and a target volume in the command to correspond to volumes in the secondary storage subsystem, wherein the source volume and the target volume are for I/O operations, and wherein the changing is performed by a switching application in the switch. (Bhaskaran column 8, lines 46-50)

Bhaskaran does not explicitly disclose wherein the data written to the primary storage subsystem and the data written to the secondary subsystem are the same.

In column 5, lines 67 – column 6, line 3, Kandasamy clearly teaches a method in which data is mirrored to both the primary and secondary server. It would have been obvious to a person of ordinary skill in the art at the time of invention to include the data mirroring system as taught by Kandasamy in order to create a perfect backup server in the case of failover. This would have been obvious because Kandasamy teaches that the above method is better suited for creating a better system for fault tolerance through shadowing. (Kandasamy column 2, lines 61-67)

As per claim 4:

Bhaskaran fails to explicitly disclose:

receiving a notification at a monitor application that the primary storage subsystem is functioning properly, wherein the monitor application is coupled to a hardware unit coupled to the primary storage subsystem; (Kandasamy column 17, lines 25-33)

synchronizing data in the secondary storage subsystem to the primary storage subsystem; (Kandasamy column 17, lines 54-56)

directing a command from the host received at the switch to the primary storage subsystem for completion. (Kandasamy column 17, lines 60-63)

In column 17, lines 25-63 Kandasamy clearly discloses a method wherein a notification is received at a monitor that the primary storage system has failed, the data is synchronized between a primary and secondary storage system, and then the commands are directed to the secondary in place of the primary storage system.

It would have been obvious to a person of ordinary skill in the art at the time of invention to include the system as taught by Kandasamy in order to create a more fault tolerant storage system failover. This would have been obvious because Kandasamy clearly teaches that the above process is better suited for a failover system without losing data from during the failover event. (Kandasamy column 4, lines 1-7)

Claim 11 is a system claim corresponding to the method claim 1. Therefore, claim 11 is rejected for the same rationale as claim 1.

Claim 14 is a system claim corresponding to the method claim 4. Therefore, claim 14 is rejected for the same rationale set forth in claim 4.

Claim 21 is a system claim corresponding to the method claim 1. Therefore, claim 21 is rejected for the same rationale as claim 1.

Claim 24 is an computer readable storage medium claim corresponding to the method claim 4. Therefore, claim 24 is rejected for the same rationale set forth in claim 4.

As per claim 31:

The method of claim 1, wherein the switch is an I/O switch implemented in a fibre channel mechanism. (inherent, fibre channel is a commonly used in networks.)

As per claim 32:

The method of claim 4, wherein the primary storage subsystem and the secondary storage subsystem comprise a plurality of logical storage units, and wherein if the I/O command is a read I/O, then reading the data from the primary storage subsystem. (Kandasamy column 5, lines 57-67)

As per claim 33:

A method of claim 32, further comprising:

determining if a switching application in the switch is in an asynchronous mode;  
(Kandasamy column 11, lines 37-42)

if the switching application is in an asynchronous mode, then:

(i) writing the data to the primary storage subsystem; (Kandasamy column 11, lines 46-49)

(ii) writing the data to a buffer in the switch; (inherent; in order to transfer data to both the primary and secondary systems the data must be buffered.)

(iii) copying, by the switching application in the switch, the data from the switch to the secondary storage subsystem. (Kandasamy column 11, lines 46-49)

determining if a switching application in the switch is in a synchronous mode;  
(Kandasamy column 11, lines 37-42)

if the switching application is in a synchronous mode, then writing the data to the primary storage subsystem and the secondary storage subsystem substantially simultaneously. (Kandasamy column 11, lines 38-42)

As per claims 35 and 39:

Claims 35 and 39 are a system and a computer readable medium claims respectively, corresponding to the method claim 31. Therefore, claims 35 and 39 are rejected for the same rationale as claim 31.

As per claims 36 and 40:

Claims 36 and 40 are a system and a computer readable medium claims respectively, corresponding to the method claim 32. Therefore, claims 36 and 40 are rejected for the same rationale as claim 32.

As per claims 37 and 41:

Claims 37 and 41 are a system and a computer readable medium claims respectively, corresponding to the method claim 33. Therefore, claims 37 and 41 are rejected for the same rationale as claim 33.

Claims 3, 13, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bhaskaran (6,266,335) in view of Kandasamy (5,513,314) further in view of Allen (7,003,693).

As per claim 3:

The method of claim 31, further comprising:

receiving a notification at the switch from a monitor application that traps an I/O alert corresponding to the failure, wherein the monitor application is coupled to a hardware unit coupled to the primary storage subsystem; (Bhaskaran column 8, lines 46-49)

Bhaskaran and Kandasamy do not explicitly disclose a method in which holds an I/O request that resulted in the failure in a busy state at the monitor application.

In column 82, lines 19-29; Allen clearly discloses a system which holds I/O requests during a failure and during a failover from a primary system to a secondary system. It would have been obvious to a person of ordinary skill in the art at the time of invention to include the I/O holding method as taught by Allen in order to create a smoother failover transition. This would have been obvious because Allen clearly teaches that the above process is better suited for managing duplexing capabilities. (Allen column 6, lines 8-14)



Claim 13 is a system claim corresponding to the method claim 3.

Therefore, claim 13 is rejected for the same rationale set forth in claim 3.

Claim 23 is an computer readable storage medium claim corresponding to the method claim 3. Therefore, claim 23 is rejected for the same rationale set forth in claim 3.

Claims 34, 38, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bhaskaran (6,266,335) in view of Kandasamy (5,513,314) further in view of Kodama (2004/0034671).

Bhaskaran and Kandasamy do not explicitly disclose using a bitmap that is available for data replication when resynchronization of the data is required between secondary storage subsystem and the primary storage subsystem whose failure was indicated earlier.

On page 3, paragraph 0040, Kodama clearly teaches a method in which a bitmap file can be used to track changes over mirrored systems. It would have been obvious to a person of ordinary skill in the art at the time of invention to use the bitmap change table as taught by Kodama in order to track changes that occur to mirrored copies. This would have been obvious because Kodama clearly teaches that the above method is better suited for a failover environment. (Kodama page 1, paragraph 0015)

### ***Response to Arguments***

Applicant's arguments with respect to claims 1, 3, 4, 11, 13, 14, 21, 23, 24, and 31-42 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Assessor whose telephone number is (571) 272-0825. The examiner can normally be reached on M-F 9:30-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Scott Baderman can be reached on (571)272-3644. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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BA

A handwritten signature in black ink, appearing to be 'SB', is positioned above the printed name.

**SCOTT BADERMAN**  
**SUPERVISORY PATENT EXAMINER**